DS-01078
(New)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS

FOR

PRECAST NOISE WALL

Effective Date
February 14, 2006

THE STANDARD SPECIFICATIONS, SERIES 2001, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

01078.01 DESCRIPTION

This work consists of construction of precast noise wall units in accordance with this specification and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans. Noise walls are defined as large panels held in place by columns used to reduce noise pollution.

01078.02 MATERIALS

The wall system shall be manufactured by a company that has been approved according to Appendix A of this specification.

A. Concrete

Cement shall meet the requirements of Section 4101 of the Standard Specifications.

Cement content per cubic yard (cubic meter) of concrete for face panels and precast columns shall be not less than 600 pounds (360 kg).

Coarse aggregate shall be Class 3 or better durability. The Contractor may use gravel with approval of the Engineer based on past history of deleterious and stain-producing material found in the aggregate source.

Air content shall be 7.5% as a target value, with a maximum variation of +1.5% -1.0%. When specified, or approved by the engineer, admixtures for the purpose if improving workability for retardation may be used.

The proposed mix design shall be submitted, to the Engineer for approval, at the Preconstruction Conference.

B. Compressive Strength

Design strength – minimum of 3500 psi (24 MPa).

Form removal/moving strength – minimum of 2000 psi (13.8 MPa).

A minimum of three cylinders per lot shall be cast to evaluate design strength. Six additional cylinders shall be required if form removal/moving is conducted at an early age. A lot shall be considered 1 week unless established otherwise by the Engineer. Three cylinders shall be used to determine design strength. If applicable three cylinders shall be used to determine form removal/moving strength, , and three shall be maintained as back-ups. The average of three test specimens shall be considered a test result.

Strength samples shall be cured with the elements until curing operations have ceased.

Elements shall be considered acceptable for shipping when the required design strength has been achieved for a given lot.

C. Patching
All lifting devices shall be filled with patching materials that will bond and be a similar texture and color to the underlying concrete. Lifting devices only used by the fabricator shall be patched by the fabricator before shipment. All other lifting devices shall be patched by the contractor after placement. Methods and materials for filling lifting devices shall be approved by the Engineer.

All patching shall be conducted such that it is visually blended with surrounding material and is not visually objectionable. A test patch shall be conducted for review by the Engineer to ensure acceptability.

D. Reinforcement & Anchors
All reinforcing steel shall meet the requirements of Article 4151.03 of the Standard Specifications.

Plastic supports shall be used to chair all reinforcing steel and shall be accepted based on approved brands as noted in Materials I.M. 451.01 Appendix A. The plastic supports shall be of similar color to the precast units.

Anchor bolts shall be set in accordance with Article 2405.09 of the Standard Specifications and shall be from an approved source listed in Materials I.M. 453.08 Appendix A.

Any anchors or lifting devices that remain exposed or have less than 1 inch (25 mm) cover shall be galvanized in accordance with Article 4100.07 of the Standard Specifications.

All lifting systems shall be submitted to the Engineer for approval prior to production. The submittal shall include all hardware to be used, placement of all hardware, and stress calculations.

All masonry plates, anchor bolts, nut, washers, and threaded rods shall be galvanized in accordance with Article 4100.07 of the Standard Specifications.

Threaded rods and anchor bolts shall meet the requirements of ASTM F 1554, Grade 55 psi (380 MPa).

Panels in the splash zone shall require epoxy-coated steel.

E. Casting
Noise wall lifting anchors shall be set in place to the required position as detailed in the lifting system submittal. The tolerance of the lifting anchors shall be +/- 1.0 inch (25mm).

The concrete in each unit shall be placed without interruption and shall be consolidated appropriately for the mix used.

Clear form oil of the same manufacturer shall be used throughout the casting operation. Form oil shall be placed in a uniform coating. Excess oil shall be avoided and removed by the producer.

The following tolerances shall apply to all columns and panels:

- All dimensions 1/4” (5 mm).
- The panels or columns shall not be bowed, warped or out of plane in any direction impacting the placement and interlocking of the panels.
- Objectionable surface defects will not be acceptable.

F. Curing
As soon as practical (after initial set) after casting, but not later than 30 minutes, wall and columns shall be covered with wet burlap and kept continuously wet until form removal/moving strength is achieved, however forms may not be removed for a minimum of 24 hours following casting.

After the initial curing period is completed, walls and panels may be moved from casting beds to a secondary curing area and covered with wet burlap and polyethylene (plastic) 3.0 mil (60 µm) thick, properly secured to retain moisture.

Other curing methods may be used as approved by the Engineer.

G. Marking
The length and placement identification number shall be clearly scribed on the bottom of each column. Special panels shall have a unique marking identifying the piece and unique characteristics. The marking shall be placed in an area visible during handling but concealed in final placement. Each shipment shall be accompanied by a certification statement.

H. Handling, Storage & Shipping
Units shall be handled with care, lifting shall be with padded straps or padded contact areas and shall be stored above ground, on wooden or padded supports, or on a sand bed. Supports shall be adequate, firm, and shall be placed evenly to prevent sagging. Columns and panels shall be handled, shipped, and stored in a manner as to prevent and /or eliminate the causes of cracking, fracturing, damaging, and excessive bending stresses.

I. Rejection
Failure to meet any of the specified requirements shall be means for rejection of columns or panels.

01078.03 METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Precast Noise Wall will be measured and paid for according to the plans.

Appendix A: PRECAST CONCRETE NOISE WALLS

GENERAL
Approval to furnish precast concrete noise walls shall be on the basis of certification from approved sources (approved plant prior to letting) and shall conform to the contract documents. Approved sources are listed in this specification.

PLANT APPROVAL
Plant approval shall be on the basis of certification and approved plant quality control.

An up-to-date Quality Control Plan that ensures all materials, mix design(s), quality of work, and fabrication methods is required and shall be subject to the approval of the Engineer.

MATERALS
All aggregates, cementitious materials, admixtures and reinforcing steel, shall be from approved sources.

PATCHING

- Polymer grouts shall be accepted based on approved brands as noted in IM 491.11, Appendix A.
- Hydraulic cement grouts shall be accepted based on approved brands as noted in IM 491.13, Appendix A.

TOLERANCES

A. All dimensions within 1/4 inch (5 mm)
B. Angular distortion with regard to the height of the wall shall not exceed 1/4 inch in 5 feet (5 mm in 1.5 m)
C. Surface defects shall not be acceptable if objectionable, however on smooth-formed surfaces defect shall not exceed 1/8 inch in 5 feet (2.5 mm in 1.5 m). On textured surfaces defect shall not exceed 5/16 inch in 5 feet (8 mm in 1.5 m).

REJECTION

A. Failure to meet any of the specified requirements
B. Defects that indicate imperfect molding
C. Defects that indicate honeycomb or open texture concrete
D. Surface defects that exceed 5/16 inch (8 mm) in 5 feet (1.5 m)
E. Chipping, cracking or fractures

HANDLING, STORAGE & SHIPPING

- Units shall be handled with care, lifting shall be with padded straps or padded contact areas and shall be stored above ground on wooden or padded supports.
- Support shall be adequate, firm, and shall be placed evenly to prevent sagging.
- Handling shall be minimized.
- Handling, storage and shipping shall be in a manner as to prevent and/or eliminate the causes of cracking, fracturing, damaging, and excessive bending stresses.

LEVELING PAD
Leveling pad shall be PC concrete and shall have a nominal compressive strength of 3500 psi (24 MPa).

MARKING
The length and placement identification number shall be clearly scribed on the bottom of each column. Special panels shall have a unique mark identifying the piece and unique characteristics. The mark shall be placed in an area visible during handling, but concealed in final placement.

CERTIFICATION DOCUMENTS

The producer/fabricator of precast concrete noise walls shall furnish on each shipment day a certified bill of materials or invoice, which identifies the county, project number, contractor's name and the number of panels. The certification of compliance shall be signed by a designated or responsible company representative and shall be stated as follows:

> The materials itemized in this shipment are certified to be in compliance with the applicable ASTM Standards and the Iowa Department of Transportation Standard Specifications.

_____
Authorized Signature & Date

One copy of the above-described documents shall be forwarded to the project engineer on the day the item(s) are delivered to the project and one copy shall be sent to the respective District Materials Engineer.

APPROVED SOURCES: PRECAST CONCRETE NOISE WALLS

The following producers are approved to furnish precast concrete noise walls on the basis of certification in accordance with the Standard Specifications:

CSI Precast
2825 Maury Street
Des Moines, IA 50317
515-264-1065

Wieser Precast, Inc.
440 Hawkeye Drive
Williamsburg, IA 52361
319-668-1888